CLAIMS

1. An organic contaminant molecule sensor comprising: an electrochemical cell having a solid state oxygen anion conductor, a measurement electrode formed on a first surface of the conductor for exposure to a monitored environment, and a reference electrode formed on a second surface of the conductor for exposure to a reference environment, the electrodes comprising material for catalysing the dissociative absorption of oxygen; and means for monitoring the potential difference between the electrodes, so that, in the absence of organic contaminant molecules in the monitored environment, the potential difference between the electrodes assumes a base value V_b and, upon the introduction of organic contaminant molecules into the monitored environment, the potential difference assumes a measurement value V_m due to the reaction of the organic contaminant molecules with oxygen in the monitored environment, $V_m - V_b$ being indicative of the amount of organic contaminant molecules introduced into the monitored environment.

2. A sensor according to Claim 1 comprising means for controlling the temperature of the cell.

3. A sensor according to Claim 2 wherein the control means comprises a heater and a thermocouple arrangement.

4. A sensor according to Claim 1 wherein the material for catalysing the dissociative absorption of oxygen is platinum.

5. A sensor according to Claim 1 wherein the solid state oxygen anion conductor is selected from the group of materials comprising gadolinium doped ceria and yttria stabilised zirconia.

6. A sensor according to Claim 1 wherein the reference oxygen environment is a solid-state source of oxygen typically from a metal / metal oxide couple such as Cu / Cu_2O and Pd / PdO or a metal oxide /metal oxide couple such as Cu_2O / CuO.

7. A sensor according to Claim 1 comprising means for controlling the oxygen electrochemical semi-permeability of the cell so as to control the sensitivity of the sensor to the introduction of the organic contaminant molecules.

8. A sensor according to Claim 7 wherein the oxygen electrochemical semi-permeability control means comprises an additional electrode in the reference environment and means for controlling the rate of flux of oxygen anions flowing between the additional electrode and the measurement electrode.

9. A sensor according to Claim 8 wherein the oxygen electrochemical semi-permeability control means comprises means for controlling the electrical current flowing between the additional electrode and the measurement electrode.

10. A sensor according to Claim 7 wherein the oxygen electrochemical semi-permeability control means comprises means for controlling the concentration of oxygen within the reference environment.

11. A sensor according to Claim 1 further comprising means for controlling the amount of oxygen within the monitored environment.

12. A sensor according to Claim 11 further comprising means for controlling the pressure within the monitored environment.

13. A sensor according to Claim 11 further comprising means for drawing a flow of gas into the monitored environment, and means for extracting oxygen from gas being drawn into the monitored environment.

14. A method of monitoring the amount of organic contaminant introduced into a monitored environment comprising: (a) providing an electrochemical cell having a solid state oxygen anion conductor, a measurement electrode formed on a first surface of the conductor for exposure to the monitored environment, and a reference electrode formed on a second surface of the conductor for exposure to a reference environment, the electrodes comprising material for catalysing the dissociative absorption of oxygen; and (b)(1) monitoring the potential difference between the electrodes in the absence of organic contaminant molecules in the monitored environment, and (b)(2) monitoring the potential difference between the electrodes upon the introduction of organic contaminant molecules into the monitored environment where the potential difference in the presence of the organic contaminant molecules is a function of the reaction of the organic contaminant molecules is the oxygen in the monitored environment; so that the difference between (I) the potential difference between the electrodes upon the introduction of organic contaminant molecules and (II) the potential difference between the electrodes in the absence of organic contaminant molecules is a function of the amount of organic contaminant molecules introduced into the monitored environment.

15. A method according to Claim 14 further comprising the step of controlling the temperature of the cell.

16. A method according to Claim 14 further comprising the step of controlling the oxygen electrochemical semi-permeability of the cell so

as to control the sensitivity of the sensor to the introduction of the organic contaminant molecules.

17. A method according to Claim 16 wherein the oxygen electrochemical semi-permeability of the cell is controlled by controlling the rate of flux of oxygen anions flowing between the measurement electrode and an additional electrode in the reference environment.

18. A method according to Claim 17 wherein the rate of flux of oxygen anions flowing between the electrodes is controlled by controlling the electrical current flowing between the measurement electrode and the additional electrode.

19. A method according to Claim 17 wherein the rate of flux of oxygen anions flowing between the electrodes is controlled by controlling the concentration of oxygen within the reference environment.

20. A method according to Claim 14 further comprising the step of controlling the amount of oxygen within the monitored environment.